

## REMARKS

This paper is responsive to the office action mailed 2 July 2004 (hereafter referred to as "office action").

### *Claim Rejections – 35 U.S.C. § 103*

Claims 1-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,612,077 to Tracy et al. ("Tracy") in view of U.S. Patent No. 6,302,964 to Umotoy et al. (Umotoy). The applicants disagree.

Claim 1 recites that the injection plate is *formed of a single, integral unit* (emphasis added). It was agreed in the office action (page 6, lines 11-12) that Tracy fails to teach this feature. Although Umotoy speaks of a "one-piece gas distribution faceplate" in the Summary of the Invention (column 2, lines 53-54), it is apparent that Umotoy's faceplate is not formed of a single, integral unit because "the faceplate 130 contains *two components*, a lower gas distribution plate 148 and a[n] upper gas distribution plate 150" (FIG. 1; column 4, lines 27-28; emphasis added). The lower and upper gas distribution plates are fused to one another to form a unitary faceplate 130 (column 4, lines 36-38). Thus, Umotoy's "one-piece gas distribution faceplate" is not formed of a single, integral unit within the meaning of claim 1.

Despite the admitted failure of the Tracy/Umotoy combination to teach or suggest the above feature of claim 1, it is stated (page 7, beginning with line 21) that "[m]otivation to make Tracy's injection plate integral ... is to provide even distribution to the process region as taught by Umotoy (column 1, lines 35-45) and to deliver plural unmixed gases to the reactor chamber as taught by Umotoy (column 2, lines 45-65).

This position is untenable. The first paragraph that allegedly supports this position (Umotoy, column 1, lines 35-45) says nothing about the structure of an injection plate except that "the plate contains a plurality of holes such that the gaseous mixture is evenly distributed in the process region" (lines 42-44). The most that is suggested by this paragraph is that even distribution of the gaseous mixture may be achieved by using a plurality of holes. Whether a plate has a plurality of holes has no bearing on whether the plate should be formed of a single integral piece or many component pieces. It certainly does not suggest any advantage to making Tracy's injection plate 12 integral.

The second paragraph that allegedly supports this position (Umotoy, column 2, lines 45-65) speaks of a "one-piece gas distribution faceplate" (column 2, lines 53-54). However,

it was explained above that Umotoy explicitly specifies that the faceplate 130 includes two components, a lower gas distribution plate 140 and an upper gas distribution plate 150, which are later fused together to form the faceplate 130 (column 4, lines 27-28; lines 35-38). The purpose for fusing the lower gas distribution plate 140 to the upper gas distribution plate 150 is to retain gases within the faceplate without using O-rings and to maintain separation of the gases within the faceplate 130 without using O-rings (column 5, lines 59-62).

There is no motivation to maintain separation of gases within Tracy's faceplate 112 because Tracy has only one gas source (gas supply 22; FIGs. 1 and 3). Although Tracy does use an O-ring 74 to prevent gas from escaping (74; FIG. 3; column 3, lines 48-50), as explained above Umotoy only suggests that components of the faceplate 130 be fused together to retain gases within the faceplate. Nowhere does Umotoy teach or suggest an advantage to using an injection plate that is formed of a single, integral unit.

Finally, it has been asserted that the modification "to make Tracy's injection plate [12] integral" would be obvious because "the use of a one-piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice." MPEP 2144.04(V)(B), In re Larson, 340 F.2d 965 (CCPA 1965).

To the contrary, there can be no suggestion or motivation to modify Tracy in this manner because it would render Tracy's electrode 12 (the alleged injection plate) unsatisfactory for its intended purpose. MPEP 2143.01, *citing In re Gordon*, 733 F.2d 900 (Fed. Cir. 1994).

Tracy states that the electrode 12 that includes a center disk 27 and a set of *concentric nesting rings* 28, 30, 32 (FIG. 3; column 3, lines 3-4; emphasis added). The outermost ring 28 is connected to the support plate 20 by a screw (FIG. 3; column 3, lines 1-3). The number of concentric nesting rings used is based upon the desired number of gas entry slits (column 3, lines 5-6). Thus, one of Tracy's intended purposes is to vary the number of gas entry slits by using a smaller or larger number of concentric nesting rings between the outermost ring 28 and the center disk 27.

Another intended purpose of Tracy is to control the gas flow by adjusting the number and lengths of the capillaries leading to a particular plenum (column 3, lines 34-38).

Yet another intended purpose is evidenced where Tracy explicitly states that "[t]he *electrode is also easily disassembled* to permit cleaning of corrosive products" (column 4, lines 13-14; emphasis added).

If Tracy is modified so that the electrode 12 is made integral as is suggested, then the electrode plate 12 becomes unsatisfactory for varying the number of gas entry slits, adjusting

the number and lengths of the capillaries, and for being easily disassembled to permit cleaning of corrosive products. Therefore, there is no suggestion to modify Tracy by making the alleged injection plate (Tracy's electrode 12) integral.

For the reasons presented above, the Tracy/Umotoy combination fails to establish *prima facie* obviousness for claim 1 because the combination 1) fails to teach the feature of an injection plate formed of a single, integral unit and 2) fails to provide a motivation to modify Tracy's electrode 12 so that it is formed of a single, integral unit. MPEP 2143.

Furthermore, claim 1 also recites that the injection plate has grooves on an upper surface of the injection plate that connect the gas inlets. It is not alleged that Umotoy discloses, nor does it disclose, an injection plate having grooves on an upper surface of the injection plate. It was also agreed in the office action (page 6, lines 13-14) that Tracy's alleged grooves (68, 70, 72; FIG. 3; column 3, lines 20-30) are not located on an upper surface of the alleged injection plate 12.

Despite the admitted failure of the Tracy/Umotoy combination to teach or suggest the above feature of claim 1, it is stated that "there is sufficient teaching in Tracy to provide motivation for relocating/extending Tracy's grooves (68, 70, 72; Figure 3; column 3, lines 20-30) such that they are located on Tracy's upper exterior surface for gas pressure/flow optimization (column 1; lines 55-68) – See lower groove position in Tracy's FIG. 3."

This position is unsupportable. The paragraph that is alleged to support this assertion (column 1, lines 55-68) does not describe Tracy's alleged grooves (68, 70, 72) whatsoever. This paragraph (column 1, lines 55-68) is directed at the conventional art, since it is found in the "Background of the Invention." This paragraph (column 1, lines 55-68) suggests only that in the conventional art the pressure drop across the electrode is relatively small (lines 57-58), or in other words, that the pressure behind the electrode is scarcely higher than the pressure used in the process (lines 58-60). Thus, at most there is an implication that Tracy's invention may provide for a pressure drop across the electrode that is larger than the "relatively small" one of the conventional art.

To suggest that this paragraph (column 1, lines 55-68) teaches anything about the alleged grooves (68, 70, 72) or Tracy's alleged injection plate 12, let alone the specific teaching that the alleged grooves (68, 70, or 72) may be relocated or extended to an upper surface of the injection plate 12, is to stretch the plain meaning of the paragraph beyond the breaking point. There is no place in Tracy's written specification where it is taught or

suggested that the gas pressure or gas flow may be optimized by relocating the alleged grooves 68, 70, 72 to an upper surface of the alleged injection plate 12.

As for the instruction to "See lower groove position in Tracy's FIG. 3", although the office action is silent as to what is actually meant by "lower groove position," it is apparent that the "lower groove position" is not the same as the position of the alleged grooves (68, 70, 72). Otherwise, it must be assumed that a term such as "position of the grooves (68, 70, 72)" would be used. Since it was alleged that the grooves recited in claim 1 are taught by the "grooves" (68, 70, 72) shown in Tracy FIG. 3, it is the position of the alleged grooves (68, 70, 72) that is of concern. The so-called "lower groove position" of FIG. 3, whatever that means, teaches nothing and suggests nothing about the relative position of the alleged grooves (68, 70, 72) with respect to the alleged injection plate 12, let alone the extension and/or relocation of the alleged grooves (68, 70, 72) to an upper surface of the injection plate. As was agreed in the office action, the alleged grooves (68, 70, 72) are "indeed located within Tracy's injection plate." Nowhere does Tracy FIG. 1, 2, or 3 suggest otherwise.

Thus, not only is it admitted that Tracy's alleged grooves (68, 70, 72) are not on an upper surface of the alleged injection plate 12, it has also been shown that there is no support in Tracy for the teaching that the position of the alleged grooves (68, 70, 72) may be extended and/or relocated.

Consequently, the Tracy/Umotoy combination fails to establish *prima facie* obviousness for claim 1 because it does not teach or suggest all the features recited in the claim. MPEP 2143.03.

Tracy also fails to establish *prima facie* obviousness for claim 1 for the reason that, even if Tracy could be said to teach that the relative position of the alleged grooves (68, 70, 72) in the alleged injection plate 12 may be varied, there is no suggestion or motivation to extend and/or relocate the alleged grooves (68, 70, 72) to the upper surface of the alleged injection plate 12.

The reason for this is two-fold, and the first reason is because Tracy itself teaches away from such a modification.

Tracy teaches, by using particular terms that have particular meaning to those of skill in the art, that the alleged grooves (68, 70, 72) would never be found on an upper surface of the injection plate 12. Tracy states that the alleged grooves (68, 70, 72) are in actuality circular *plenums* (column 3, lines 22-26; emphasis added). According to the American Heritage® Dictionary of the English Language, Fourth Edition, Copyright © 2000, a

“plenum” is defined as “A condition, space, or *enclosure* in which air or other gas is at a pressure greater than that of the outside atmosphere” (emphasis added). The act of extending or relocating the circular plenum (68, 70, 72) to a surface of the alleged injection plate 12 would cause the plenum to be exposed to the cavity defined by the slots 42, 44, 46, 48 that are milled in the support plate 20 (FIGs. 2 and 3; column 3, lines 10-13). Once that occurs, the plenum would cease to be a plenum, since it is no longer enclosed and has the same pressure as the outside cavity. Tracy teaches that the circular plenums (68, 70, 72) should have gas pressures of about 2-4 torr (column 3, line 27), and that the cavity defined by the slots 42, 44, 46, 48 typically has a pressure of 25 torr (column 3, lines 13-15).

Secondly, there can be no suggestion or motivation to move the circular plenums (68, 70, 72) to an upper surface of the alleged injection plate 12 because it would render both the circular plenums (68, 70, 72) and the capillaries (50, 52, 54, 56, 58, 60, 62, 64, 68) useless for their intended purpose. MPEP 2143.01, *citing In re Gordon*, 733 F.2d 900 (Fed. Cir. 1994). Tracy states that by adjusting the numbers and lengths of the capillaries leading to a particular plenum, the fraction of the total gas flow which ultimately enters the plasma reactor through the corresponding slit may be readily controlled (column 3, lines 34-37). This capability is lost if the circular plenums (68, 70, 72) are moved to an upper surface of the injection plate 12, because gas would then enter directly into the circular plenums (68, 70, 72) from the cavity defined by the slots 42, 44, 46, and 48, rather than through the capillaries.

For the reasons presented above, the Tracy/Umotoy combination also fails to establish *prima facie* obviousness for claim 1 because the combination 1) fails to teach the feature that the injection plate has grooves that connect the gas inlets on an upper surface of the electrode 12 (the alleged injection plate) and 2) fails to provide a motivation to modify Tracy’s circular plenums 68, 70, 72 (the alleged grooves) so that the plenums 68, 70, 72 are moved to an upper surface of the electrode 12. MPEP 2143.

Claim 1 recites an apparatus that includes a body and an injection plate. It has been alleged that Tracy’s support plate 20 (FIG. 3) is the recited body. It has been alleged that Tracy’s electrode 12 (FIG. 3) is the recited injection plate.

Claim 1 further recites that the body has a bottom wall and that the injection plate is attached to a bottom surface of the bottom wall. Tracy FIG. 3 shows that the alleged injection plate (electrode 12) is connected to a bottom wall of the alleged body (support plate 20) by the screws 26.

Claim 1 further recites that *the body* has a *plurality of gas inlets that perforate the bottom wall* (emphasis added). It is alleged that Tracy's capillaries 52, 54, 56, 58, 60 are the plurality of gas inlets. This is incorrect. Tracy's capillaries are not part of Tracy's support plate 20 nor do they perforate the bottom wall of Tracy's support plate 20.

As to the applicant's assertion that Tracy's capillaries 52, ..., 60 are not part of Tracy's support plate 20, it is stated that "Tracy clearly shows his gas inlets ... *are attached to*, and are therefore part of, Tracy's body 20" (emphasis added). To the contrary, Tracy's capillaries 52, ... 60 are NOT attached to, and therefore not a part of, Tracy's support plate 20.

Tracy FIG. 2 is a plane view of an electrode (column 2, lines 42-43). Tracy FIG. 3 is a cross-sectional view taken along the line 3-3 of FIG. 2 (column 2, lines 44-45). The line 3-3 bisects the rectangular region 44, 46 indicated by dashed lines (FIG. 2). The rectangular region 44, 46 represents *slots that are milled into the support plate 20* (column 3, lines 11-12; emphasis added). Tracy FIGs. 2 and 3 show that the capillaries 52, ... 60 are centered within the slots (44, 46), that the capillaries protrude into the regions defined by the slots, but *nowhere is it shown that the capillaries are attached to the alleged body 20* (emphasis added).

According to Tracy, process gas from source 22 enters the slots 44, 46, through a conduit 40 through a hole in the support plate 20 (FIG. 3; column 3, lines 10-11). The gas flows from the slots 44, 46 through the capillaries 52, ... 60 (FIG. 3; column 3, lines 22-24). As can be seen in FIG. 3, small arrows indicate the movement of gas from the conduit 40, through the slots 44, 46, and into the tips of the capillaries 52, ... 60.

Consequently, the applicants submit Tracy FIGs 2, 3, and corresponding written description clearly show that the capillaries 52, ... 60 are not attached to the support plate 20, and therefore cannot be part of the support plate 20, which is required by claim 1. It is respectfully requested that if the Examiner persists in maintaining that the capillaries 52, ... 60 are attached to the support plate 20, please indicate for the applicants which specific portion of the capillaries 52, ... 60 are attached to which specific portion of the support plate 20.

Finally, assuming that the capillaries are the recited plurality of gas inlets belonging to the recited body, they still fail to meet the additional recited feature that they perforate the bottom wall of the body, because at no place do the capillaries 52, ... 60 contact or otherwise touch the bottom wall of the support plate 20 (FIGs. 2 and 3). Tracy shows only one gas inlet

(conduit 40, FIG. 3) that perforates the bottom wall of the body (support plate 20, FIG. 3), and the conduit 40 of course fails to meet the recitation of “a plurality of gas inlets.”

As for the Umotoy reference, it is alleged that Umotoy teaches “his body (130; Figure 9) has a bottom wall (148; Figure 9) and a plurality of gas inlets (204, 206, 210; Figure 9) that perforate the bottom wall as is claimed in claim 1.”

To the contrary, claim 1 also requires the feature that an injection plate is attached to a bottom wall of the body. It has been alleged that Umotoy’s lower gas distribution plate 148 (FIG. 9) is the recited bottom wall of the alleged body 130 (FIG. 9). However, Umotoy FIG. 1 clearly shows that, contrary to the above feature of claim 1, there is no injection plate attached to the alleged bottom wall 148 of the alleged body 130.

Consequently, the Tracy/Umotoy combination also fails to establish *prima facie* obviousness for claim 1 because it fails to teach or suggest the features of a body and an injection plate having the plurality of gas inlets and arranged in the manner specified by the claim. MPEP 2143.03.

Claims 2-6 depend from claim 1. Consequently, claims 2-6 are also nonobvious with respect to the Tracy/Umotoy combination because they depend from a nonobvious independent claim. MPEP 2143.03, *citing In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

Regarding independent claim 7, like claim 1 it recites, *inter alia*, a body having a plurality of gas inlets that perforate the body, and an injection plate attached to a bottom surface of the body, the injection plate having an upper exterior surface with grooves that connect the gas inlets. Thus, all the arguments presented above regarding claim 1 apply to claim 7 except for the argument that is based upon the body being formed of a single, integral unit.

Consequently, for the reasons presented above for claim 1, the Tracy/Umotoy combination also fails to establish *prima facie* obviousness for claim 7 because the combination 1) fails to teach the feature that the injection plate has grooves that connect the gas inlets on an upper surface of the electrode 12 (the alleged injection plate) and 2) fails to provide a motivation to modify Tracy’s circular plenums 68, 70, 72 (the alleged grooves) so that the plenums 68, 70, 72 are moved to an upper surface of the electrode 12. MPEP 2143. The Tracy/Umotoy combination also fails to establish *prima facie* obviousness for claim 7 because it fails to teach or suggest the features of a body and an injection plate having the plurality of gas inlets and arranged in the manner specified by the claim. MPEP 2143.03.

Claims 8-15 depend from claim 7. Consequently, claims 81-5 are also nonobvious with respect to the Tracy/Umotoy combination because they depend from a nonobvious independent claim. MPEP 2143.03, *citing In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

***Conclusion***

For the foregoing reasons, reconsideration and allowance of claims 1-15 of the application is requested. Please telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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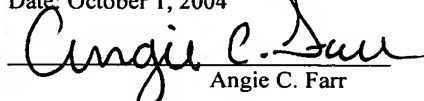
Respectfully submitted,

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